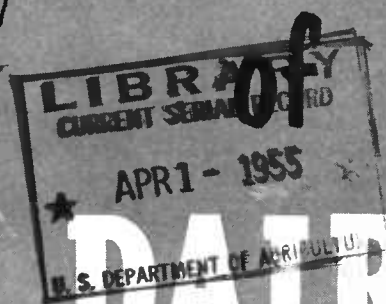


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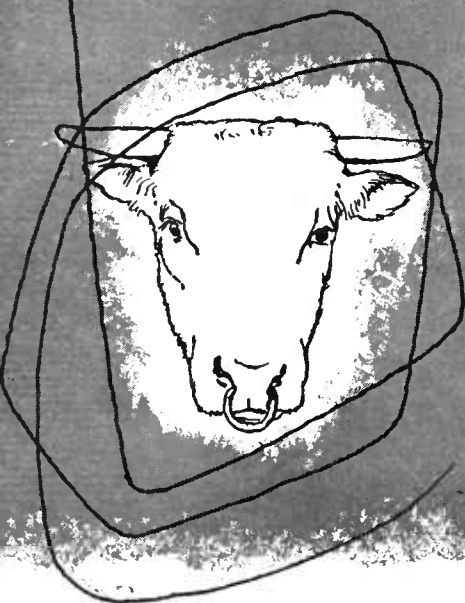
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Care and Management



of DAIRY BULLS



FARMERS' BULLETIN NO. 1412
U. S. DEPARTMENT OF AGRICULTURE

GOOD DAIRY BULLS are worth so much for building up the production of dairy herds that they should be taken care of properly.

Because of their temperament, dairy bulls are often difficult to handle; consequently they do not always receive proper care, exercise, and management, and as a result do not give good service.

Proved sires, which are necessarily old bulls, are coming into more general use, and they need special care and attention in order that their period of useful breeding may be extended as long as possible.

This bulletin tells briefly how to handle dairy bulls safely, how to keep them in good condition, and discusses numerous problems bearing on their care and management.

Washington, D. C.

Revised June 1954

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Care and Management of

DAIRY BULLS

By J. B. Parker and P. C. Underwood,¹ Dairy Husbandry Research Branch,
Agricultural Research Service

Importance of Proper Care and Management

GOOD SIRES kept in good breeding condition are very important to the dairy industry, as it is largely through the use of good sires that high-producing herds are developed.

Because of their nervous temperament and great strength, mature bulls must be handled with care. Many valuable bulls are prematurely lost for service because of poor care and poor management.

Newspapers and farm papers all too frequently tell of persons being injured or killed by bulls, as a result of improper equipment or wrong handling. Because of such occurrences, dairy bulls have come to be looked on in some cases as necessary evils. This attitude often means neglect in such essentials as feeding, exercise, removal of manure from pens, and various other details of care.

The last census of dairy bulls was taken in 1920, when the number reported was about 772,000. About 1 farm in every 6 having dairy cattle kept a bull. According to a recent estimate of the Agricultural Marketing Service, based on the present number of milk cows and the probable percentage of dairy-purpose cows, there are probably not more than 900,000 dairy purpose bulls in the United States.

Every dairyman should have the services of a well-bred bull, and every bull should be given the care and management that will insure the greatest use from him.

Feeding

Bull calves to be raised for breeding purposes should be fed and handled much the same as heifers.² If skim milk is fed, it is desirable to give the bull calves, after they are 3 months of age, a little more grain than the heifers get, and to delay taking them off skim milk until they are 8 or 10 months of age. As a rule, bulls grow somewhat faster than heifers, and this feeding enables them to attain their best size and development.

A bull that is small because of improper development resulting from poor feeding, does not necessarily transmit small size to his progeny. It is difficult, however, for one unfamiliar with the ancestry of the bull to determine whether his small size is due to heredity or to poor development.

Bulls as a rule will be of sufficient size and maturity for light service at 12 months of age. From this time on they may be fed a grain ration much the same as that given to cows that are in milk. Some breeders feed their regular herd mixture. Bulls should be fed enough to keep them in a vigorous

¹Transferred to the Department of Health, Education, and Welfare October 25, 1953.

²Farmers' Bulletin No. 1723, Feeding, Care, and Management of Young Dairy Stock.

NOTE.—This is a revision of a former edition by J. R. Dawson.

physical condition, but not too fat, because high finish has a tendency to make them sluggish. This is especially true of old bulls, which often have a tendency to become weak in their legs because of excessive weight. In this condition they hesitate to mount and therefore are slow breeders. If bulls become too fat, cut down the grain ration and give them regular exercise.

The amount of grain to feed daily varies with the individual, depending on the size and condition of the animal and the kind of roughage. The following grain mixtures have been used with success:

Mixture No. 1

	<i>Pounds</i>
Ground corn-----	300
Ground oats-----	200
Wheat bran-----	200
Linseed meal-----	100

Mixture No. 2

Ground oats-----	300
Wheat bran-----	200
Ground corn or barley-----	100
Cottonseed meal-----	100

Ground oats are considered especially valuable for bulls.

The legume hays—alfalfa, clover, vetch, soybean, cowpea—are excellent roughages and should be fed liberally if possible. These hays, especially alfalfa, are high in protein and mineral matter and are valuable for keeping heavily used bulls in condition. Bulls should be fed 10 to 20 pounds of legume hays a day, depending on their size and condition. When nonleguminous roughages are fed—timothy hay, prairie hay, corn silage, fodder, or stover—the grain mixture should be higher in protein than that fed with legume hays.

On some farms the bulls are given spoiled or musty hay, or waste feed left by other animals. This is not a desirable practice. Bulls should be fed good, wholesome feeds.

Breeders differ as to the advisability of feeding silage. Some maintain that a considerable amount of silage is likely to lessen the vigor

of a bull, and may make him sterile. Others feed silage in large quantities and report no undesirable results. So far as experimental work shows, it is probable that silage does not have any direct effect on the breeding powers. Large amounts of silage or other extremely bulky feeds may have a tendency to enlarge the paunch so that the bull does not serve well. From 10 to 15 pounds of silage a day, with other roughage, can be fed safely without impairing the usefulness of the animal. Some recent experiments on the feeding of silages to dairy bulls indicate that they can be fed considerably larger amounts without impairing their breeding ability, providing they also get sufficient exercise. They have been fed as much as 4 pounds of grass silage per 100 pounds of live weight per day without adverse effects.

Many bulls die as a result of eating pieces of wire, nails, or other metal objects that are contained in feed or which may be picked up off the ground. Take extreme care to see that such materials are kept out of the bull's reach and, of course, out of his food. If baled hay is fed, cut the wires with pliers so that short pieces will not break off and later be eaten with the hay. Do not leave nails, pieces of wire, or other metal objects lying around where they may be picked up by the animals.

Pasture grass is good for bulls, and if it is possible to provide a strongly fenced pasture the work of feeding and handling the bull will be reduced to a minimum. If the grass is plentiful, little or no additional feed is necessary. Furthermore, a bull will get exercise by grazing that would not be possible in a small pen. It is not good practice to pasture the herd bull with the cows.

The question is often asked as to whether the feed has any effect on the number or activity of the sperm

cells in the bull's semen. If it does have an effect it is probably indirect, acting on the general physical condition of the bull. Any deficiency which is severe enough to alter the physical condition of the bull to any marked degree will ultimately result in reproductive failures. In spite of reports to the contrary that have appeared from time to time, there is no experimental evidence to warrant a conclusion that a ration deficient in vitamin E will affect the reproductive functions one way or the other. However, if the ration is markedly deficient in vitamin A it will eventually impair the reproductive functions.

Within recent years much experimental work has been done on the influence of certain hormone preparations on the fertility and sexual vigor of bulls. In some cases the response has been quite pronounced for limited periods of time. The experimental work has not reached a point, however, where definite conclusions or statements can be made as to the advisability of using such preparations. If one had an especially valuable breeding bull that had become infertile, it would be worth while to try some of these preparations under the guidance of an experienced person.

Dairy bulls should have plenty of water. Watering is often neglected, especially when it is difficult to keep a constant supply in the stall or pen, or when the bull is difficult to handle. Water the bull at least once a day during the winter, and twice a day during the summer.

Housing and Exercise

If bulls are to be kept in good breeding condition they should be properly housed, and they must get exercise. It is poor practice to compel a bull to stand in a small stall constantly without exercise; it may ruin him as a breeder, and it may make him vicious.

The main things to be considered in providing quarters are: (1) Safety and ease in handling the bull; (2) a comfortable stable or shed to protect him from the weather; and (3) some means of exercise.

Stabling

A shed or barn opening into a paddock or yard is a practical shelter for a bull. The shed may be left open on the south side to make it light and dry, but should be closed on the other sides to keep out cold winds and storms. Outdoor life is beneficial to a bull. In a cold climate, or extremely cold seasons, it is well to have a barn that can be closed. The barn should be well ventilated and well lighted. Either a shed or a barn should be large enough to allow the animal to move around freely. A strong stanchion or tie, and a feed manger are advisable. A feeding alley in front is desirable, so that the handler will not have to enter the pen to feed. If the shed opens into a yard, make a gate for the opening. By driving the animal into the pen and closing the gate, a man can work in the yard without danger from the bull. Also, he can clean the pen safely by driving the bull into the yard and closing the gate.

The tie, or stanchion, may be made of heavy planks or iron pipes. With the bull in the stanchion one can work in the pen with little risk. Often a rope is run from the feed alley through a pulley and attached to the stanchion. If feed is placed in the manger, the bull will put his head through the stanchion, and the stanchion can then be shut with the rope.

Some breeders have a box stall in the main barn, with a door opening into a yard. The advantages of this plan are that the bull can see the other cattle, which often appears to cause him to be more quiet, and that he can be fed and cared for

with the rest of the herd. The box stall should be built strongly, preferably of iron pipes set in concrete. It is a good idea to have stanchion, manger, and water supply in the stall. Take particular care to see that the catches and locks on doors and gates are such that the bull cannot open them with his head or horns.

Safekeeper Bull Pen

A pen known as the safekeeper bull pen, which makes possible the handling and feeding of bulls without the attendant having to come in contact with the animal, has been designed by the Department of

Agriculture (fig. 1). This pen includes a shed with stanchion and manger, the latter being reached from a feeding alley in front. A sliding door, opening into a yard, is operated with ropes from the feeding alley so that the bull can be shut in the adjoining yard while the stable is being cleaned. A gate and a breeding rack are so placed in the yard that it is unnecessary to go into the yard where the bull is. The pen may be in a detached building or in a corner of the barn. Breeders have used various modifications of this plan with success and have kept many valuable sires that otherwise would have had to be disposed of.

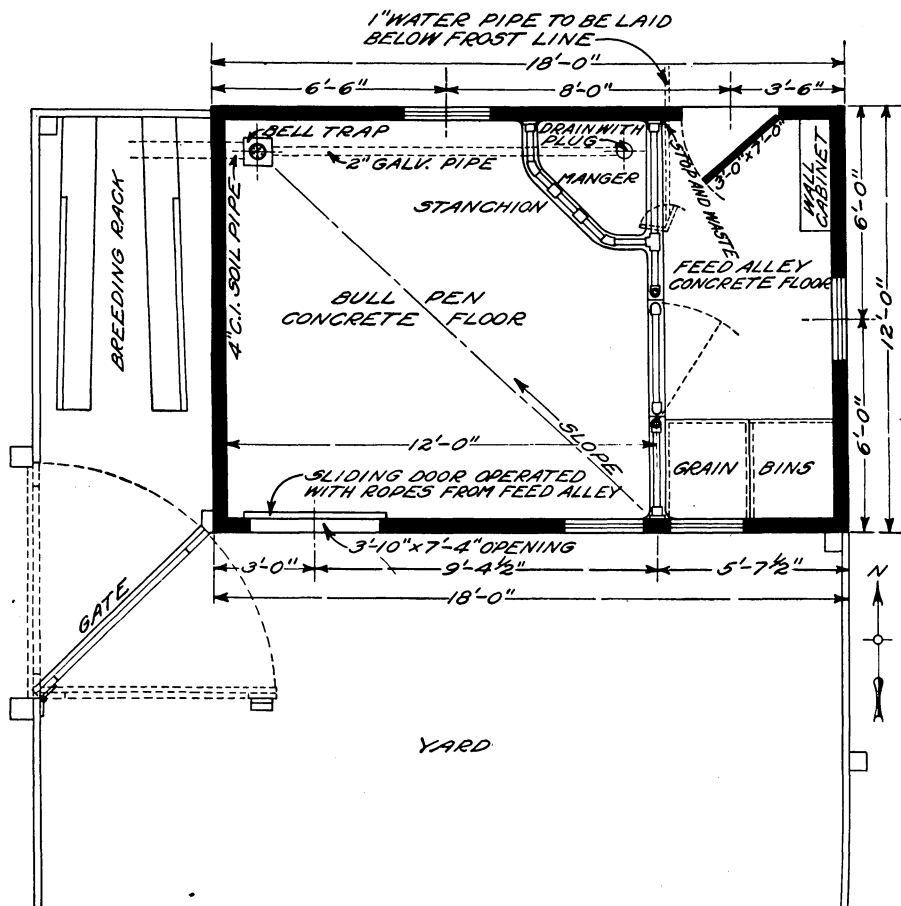


FIGURE 1.—Plan of safekeeper bull pen.

Bulls should have a clean, well-drained yard or paddock for exercise in connection with the barn or pen. Experience shows that exercise plays an important part in keeping a bull vigorous and healthy.

To accommodate two bulls, another pen and exercise yard can be built adjoining a common feeding alley.

Plans for building a safekeeper bull pen usually can be obtained from your State Extension Service.

Fencing

Never place a bull in a yard or pasture that does not have a substantial fence. After a bull has once broken through a fence, it is much harder to keep him in. The fence should be 5 to 6 feet high or too high for him to jump over. Solid fences—those that obstruct his view—are not advisable, except possibly with extremely vicious bulls. Bulls usually are more contented if they can see beyond the fence. If the fence is solid, it is a good plan to make a mound of earth near the center of the enclosure high enough so the bull can see what is going on outside. This keeps him away from

the fence, and he is not so anxious to get out.

The fencing materials most commonly used are woven wire, barbed wire, planks, rails, and iron pipe. If barbed wire is used put the posts not more than 8 to 10 feet apart, stretch the wire tight, and space the strands 8 to 12 inches apart. Five-foot heavy woven-wire fencing with one or two strands of barbed wire on top, makes a good, durable fence.

A pole or rail fence is practical and cheap on farms where such material is available.

Set wooden posts 8 feet apart, preferably in concrete. Nail the poles to the posts, 8 to 12 inches apart. If a flat place is chopped at each end of the poles they can be nailed solidly against the posts. It is important to nail the poles to the posts from what will be the inside of the pen, to prevent the bull's forcing the nails out by pushing against the poles. If poles or rails are not available, 2- by 6-inch planks may be used (fig. 2).

Another type of fence often used consists of reinforced-concrete posts set 8 to 10 feet apart, with iron pipe for rails. The rails are run through holes in the posts. If



FIGURE 2.—Fence of 2- by 6-inch planks on heavy posts.

concrete posts are used, they must be strongly reinforced. Although this type of fence may be expensive, it is strong, substantial, and durable.

Danger and inconvenience will be avoided if all gates are strong, and equipped with reliable locks and catches.

In recent years the use of the electrified wire fence as a permanent or temporary fence has increased greatly, and some breeders are using electrified fences for their bull pens or bull pastures. It would be dangerous to rely wholly on one or two electrified wires to restrain an unruly and vicious bull. An electrified wire strung along the inside of the regular bull fence, however, would tend to prevent the bull attacking the fence with his horns, or fighting through the fence with another bull in an adjoining pen.

Several reliable companies are now making this electrical equipment. Home-made outfits devised by inexperienced persons are likely to be dangerous.

Means of Exercise

The importance of exercise is often underestimated. Many bulls, after their value has been proved, are found to be sterile or slow breeders, which may be due largely to close confinement and lack of activity.

The pen should be large enough to permit the bull to take plenty of exercise. Regular exercise helps materially to keep bulls in vigorous condition. But many bulls, even when they have a roomy yard or pasture, are inclined to be lazy and sluggish and do not stir about enough. It may be necessary to exercise the sluggish bull or induce him to exercise himself, and various methods have been devised for the purpose.

One way is to yoke bulls up and work them like oxen. Where there is only one bull, he can be worked

alone or hitched and worked with a horse. Bulls can be used to haul manure, plow, pull stumps, and do various other jobs. Thus the bull not only gets exercise, but at the same time does some farm work.

The treadmill is used in some cases but is not always satisfactory, because the bull sometimes refuses to walk on the tread unless he is watched, and he may also learn various tricks to stop the mill. Then, too, if the incline is wet or slippery, the animal may fall and suffer injury.

If two or more bulls are turned out together, usually they will get considerable exercise, but they may injure one another, especially if they have horns. There are cases on record of valuable sires being injured to such an extent as to be useless for breeding. However, a young bull turned in with an older one probably will be active enough to keep out of the way. Also, having the pen or lot large enough so it would be hard for one bull to corner the other lessens the danger of the bulls injuring each other.

Bulls may be induced to exercise themselves with an empty barrel or keg by bunting or rolling it around the pen. The keg may be left on the ground or may be hung by a rope or chain, low enough so the bull can butt it with his head, or a block of wood with the corners rounded will serve the purpose (fig. 3). Some bulls spend hours playing with contrivances of this sort, others pay little attention to them.

When an exercise pen is not available, it is a common practice to tie the bull to a ring which slides on a suspended wire or cable (fig. 4). The cable should be strong and should be 75 to 100 feet long. It is desirable to use a $\frac{5}{8}$ -inch iron ring with a swivel link. The cable should be high enough so the bull cannot get his feet over the lead chain. About 12 to 15 feet of lead chain is required.

A revolving sweep will give the bull some exercise if he will use it. These schemes, however, are not always successful, because sometimes when the bull gets used to the devices he will lie down and take but little exercise.

Sometimes a bull is staked out or tied to a weight that can be dragged around from place to place while he grazes. If this plan is used, it is well to put the chain around the horns and on down through the ring in the bull's nose. It is a good plan to wrap the chain with tape or cloth, or to enclose it in a short piece of garden hose, so as not to rub off the hair and skin.

A bull exerciser, which is operated by an electric motor, is on the market. The leading arm has a chain attached to the outer end. This chain snaps onto the ring in the bull's nose, and when the arm is turned around and around by the motor, the bull is forced to walk in a circle. This device can also be set to reverse its motion after each half circle, thus forcing the bull to turn at each half circle.

At the dairy experiment station, Beltsville, Md., where several old bulls are kept in service, an exerciser designed to exercise a number of bulls at once has been in use for several years. A circular framework with a radius of approxi-



FIGURE 3.—Exercising: Bull playing with a suspended block of wood. A strong, empty keg may be used.

mately 22 feet is mounted on wheels. Beams project out from the center like spokes from a hub. The beams are attached to the turnplate which rests on a pin set in a post at the center. Toward the outer edge the beams are supported on wheels that travel on a concrete track. Bulls are hitched or tied in spaces between the beams at the outer edge of the circle, and are compelled to walk on a circular track. One or sometimes two bulls do the pulling, and an attendant sits on a platform in the center to keep the bulls walking (fig. 5). The bulls are exercised approximately 1½ hours each day.

Service

Separate the bull calves from the heifers before they are 6 months old,

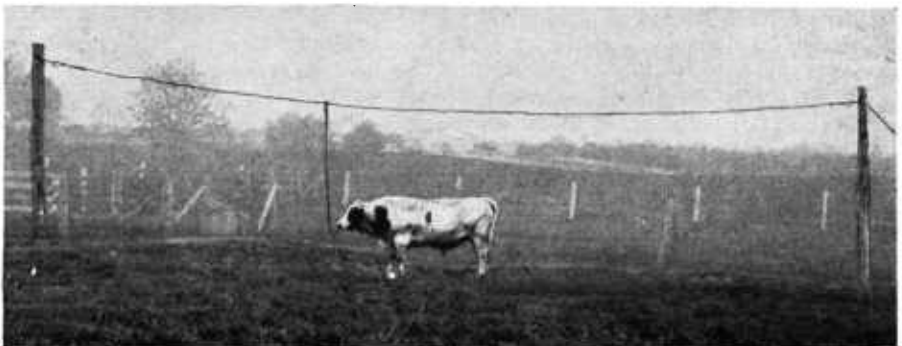


FIGURE 4.—Exercising: Bull tied to a suspended cable which affords him considerable exercise.

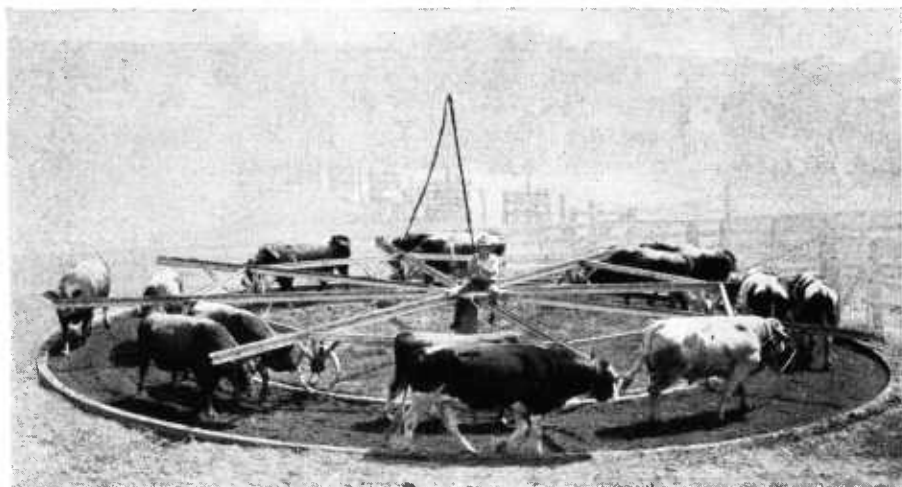


FIGURE 5.—Circular bull exerciser at the United States dairy experiment station, Beltsville, Md.

as some early maturing bulls at that age may get heifers in calf.

A bull is old enough for light service at 12 months of age, but until he is 18 months old he should be bred to only a few cows. At 2 years of age, during the breeding season, he should be able to serve four or five cows a week, without injury. It is not advisable to allow a mature bull to serve more than 1 cow a day, and never more than 2 cows in one day, nor more than 75 to 100 during the year. Cases are on record in which bulls have sired more than 100 calves in a year's time, but such heavy service is not advisable as a general practice. The amount of service that bulls can be permitted without injury to their breeding efficiency or fertility seems to vary greatly.

Fertility

A study of the breeding records of 20 bulls (proved sires) all over 5 years of age, owned by the Dairy Husbandry Research Branch, including a total of 2,982 services to fertile cows, showed that there was a trend toward lower average fertility of the sires as the number of

services per month increased. The average breeding efficiency or fertility of the sires, as measured by the percentage of services to fertile cows that resulted in conceptions, was 47.2 percent for the months when 1 to 3 services occurred, as compared with 33 percent for the months when 10 or more services were permitted. Also, the average efficiency decreased as the amount of service for the preceding month increased. The average fertility was 47.3 percent for the month following months when no service had occurred; it decreased to 44.6 percent for the month following months when 1 to 3 services had occurred; and there was a further consistent decrease in fertility to 29.6 percent for the month following months when 10 or more services had been permitted. There was, however, wide variation between the individual bulls in this respect.

Season of the year appears to have had little if any effect on the fertility of the sires, on an average, at the experiment stations of the Branch. For 42 sires, of which 22 were at Beltsville over a 4-year period and 20 at 8 other stations, there appeared to be a slight in-

crease in the average number of services required for a conception in summer as compared to winter. This was mostly due to the breeding records of the Beltsville sires. Results for the different stations, however, except possibly Beltsville, did not vary greatly enough or in any order that would indicate a seasonal effect.

Sires differ so greatly in breeding efficiency or fertility with advanced age that no general rule can be given as to when an old bull may become an uncertain breeder or useless for breeding purposes. The Branch in its breeding experiments often keeps old sires in service as long as possible, which affords some comparison of their fertility with age. Of 20 sires owned by the Branch, 15 were in service at 10 years, 8 at 12 years, and only 4 at 13 years of age. Most of these sires were in service until no longer of use. The fertility of the sires at the age of 5 to 7 years, as measured by the percentage of services to fertile cows that resulted in conceptions, averaged 51.9 percent, and there was an inconsistent but general decline with advanced age to an average of 28.3 percent for the few sires still in service at 13 years of age or over.

Fertility Examination

The first indication of low fertility in a bull is his failure to get cows with calf. If only 1 or 2 cows fail to conceive, the trouble may be with these particular cows. However, if several cows fail to conceive following repeated services, it is reasonable to assume that a breeding problem exists. The difficulty may be either with the bull or with the cows. As a first step in determining where the difficulty lies, a sample of the bull's semen should be collected, preferably with an artificial vagina, and examined microscopically to be sure the sperm are alive and capable of fertiliza-

tion. It should also be examined bacteriologically for the presence of infection. The bull's genital organs should be examined for evidence of infection or crippling abnormality. A blood sample should be collected and examined for the presence of infections known to affect the fertility of bulls.

These examinations may show that the bull is not at fault and the cause is really a herd problem among the cows. In any case, appropriate steps must be taken to eliminate the condition. A veterinarian or other experienced person with proper equipment should be employed to make the examination and to interpret the findings.

Breeding

In breeding cows, one service should be as efficient in getting conception as a greater number of services, at one oestrus or heat period. Because of the excessive weight of a heavy bull, the heifers or cows may fall, or it may be difficult to get them to stand. In this event a breeding rack is helpful.

The breeding rack consists of a stall and a stanchion into which the cow is led for breeding. On each side is an incline with cleats on which the bull rests his feet when he mounts for service. The weight of the bull is on the rack and not on the cow. Some are so constructed that the stanchion can be moved forward or backward, according to the size of the cow being bred (fig. 6).

Plans for building a breeding rack can usually be obtained from your State Extension Service.

If a young bull is being bred to a large cow, it is often difficult for him to mount high enough for service. Standing the cow with her hind feet in a shallow pit is a device often used to correct this difficulty.

In general, the bull should never be allowed to run with the herd. If he does, some heifers will un-

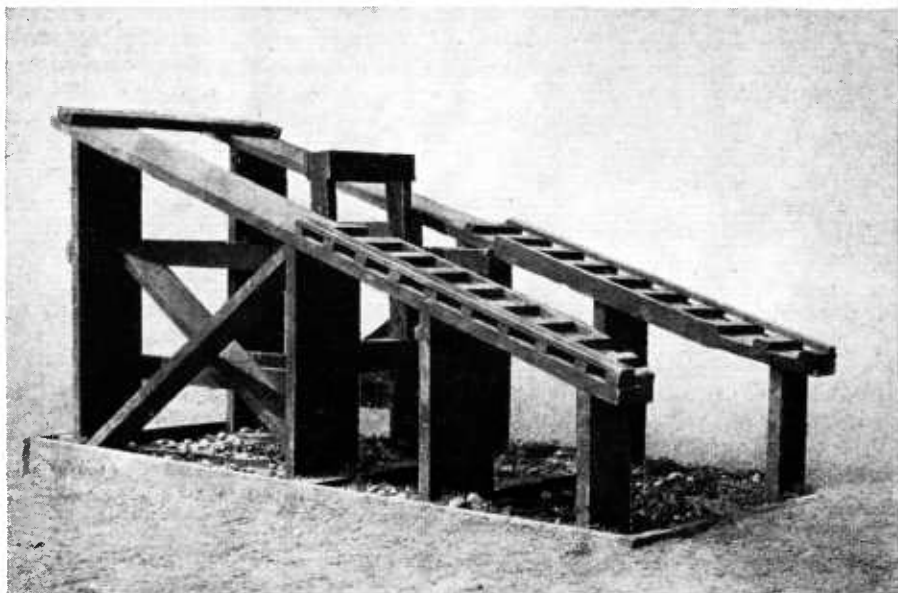


FIGURE 6.—Breeding rack.

doubtedly be bred too young. In addition, there is no accurate method of telling whether the cows are safely with calf, and those that have breeding trouble are not quickly discovered. Then, too, there is no record of when to expect calves and prepare the cows for calving. There is also a tendency for the bull to waste his vitality and energy by serving the same cow several times. A bull allowed to run in pasture with the herd does get more exercise, however, and this may offset to some extent the vitality he may waste in serving too often.

Artificial Insemination

Tremendous interest has developed in the use of artificial insemination for breeding dairy cows since 1939, when the first artificial-breeding association was organized. In that first year, 7 units used 53 bulls to breed about 7,500 cows artificially. In 1953, nearly 5 million cows, or about 20 percent of all the milk cows in the United States, were

bred artificially. More than 1,600 artificial-breeding units used about 2,600 bulls in nearly 100 studs. Some of these studs have developed a large volume of business. For example, the New York stud, which is statewide, used about 150 bulls and inseminated more than 360,000 cows in 1953.

The principal reason for operating an artificial-breeding association is to improve the milk-producing ability of the dairy-cow population through the use of outstanding sires. Through artificial breeding, the use of such sires can be multiplied several hundred times over that of natural service. The average number of cows bred per sire in artificial-breeding associations in 1953 was 1,865. Certain outstanding sires have been used to breed from 10,000 to 15,000 cows yearly.

Only veterinarians or specially trained technicians should attempt the collection and preparation of the semen for holding or shipment, and artificial insemination of the

cow on receipt of the package. Further information on methods of collecting, storing, and transporting semen from bulls, together with suggestions for impregnating cows, will be sent if a request is addressed to the Dairy Husbandry Research Branch, United States Department of Agriculture, Beltsville, Md.

Keeping Records

A breeding record of the bull should be kept. It enables the

breeder to know when to expect calves. With registered animals, it is necessary to know the exact service date.

The system of record keeping need not be elaborate. The form shown in table 1 is satisfactory and practical.

These forms may be made at home with pen and ink, and tacked up near the bull pen for ready reference. The records can be copied into the herd-record book for future reference.

TABLE 1.—*Form for breeding records*

Name or cow number	Date bred			Date due	Date calved	Bull used	Sex of calf	Remarks
	1	2	3					
Roan---	Feb. 17	-----	-----	Nov. 26	Nov. 28	Prince	Male	Sold for veal.
Rose---	Jan. 3	Jan. 24	-----	Nov. 2	Nov. 1	--do----	Female	

A gestation table will be of assistance in calculating the time of calving. The average gestation period for Ayrshires, Holsteins, and Jerseys is about 279 days; for Guernseys, about 284 days; and for Brown Swiss, about 290 days. Table 2 is a gestation table based on the 279-day period. For Guernsey cows add 5 days to the due date given in the table, and for Brown Swiss cows, add 11 days. The gestation period for heifers bred for the first calving will be about 1 day earlier than the table shows.

If a gestation table is not at hand, a good plan is to count back 3 months from the date of service and add 6 days. This will be the approximate due date.

Cost of Keep

The cost of keeping a bull is an important item to consider. The individual farmer will want to know what the cost will be. The question may also come up in con-

nection with bull associations or other forms of joint ownership. Table 3 shows the average feed consumption, and other costs, on 95 bulls in Vermont, Indiana, and western Washington. The figures are for an average of 2 years.

A number of factors enter into the cost of keeping a bull. Age, method of feeding, and price of feeds are some of them. From table 3 one can estimate the amounts of the different kinds of feed and apply the prices of feed, labor, etc., prevailing in the particular locality.

Buying and Selling

Most dairymen buy young bulls of breeding age, use them for 2 years, and then, to avoid inbreeding, sell them. In a large number of cases the bulls are sold for slaughter or knowledge of their whereabouts is lost. Some of these bulls may prove to be excellent sires, as shown by the superiority of the daughters over their dams, but under this

TABLE 3.—*Feed consumption and other costs of keeping a bull for 1 year*

	Vermont	Indiana	Washington
Concentrates.....pounds..	336	1, 399. 7	630
Dry roughage.....do.....	6, 734	4, 025. 4	5, 967
Succulent roughage.....do.....	2, 396	6, 002. 8	3, 069
Bedding.....do.....	269	645. 4	43
Pasture.....dollars..	¹ 1. 92	4. 56	13. 56
Labor.....hours.....	37. 7	35. 7	40. 4
Total other costs ²dollars..	14. 21	29. 71	41. 81

¹ Acres.² "Total other costs" includes interest, insurance, bull's share of buildings, depreciation, etc.

practice the sires will have been disposed of before the fact becomes known.

It is better to retain ownership of the bulls until production records of their daughters can be compared with records of the dams. If the production records of the daughters are superior, and other considerations warrant, such bulls should be kept in the herd or otherwise disposed of in such a way that they will continue in service.

Of course if the production records of the daughters do not justify keeping the bull as a herd sire, he should be disposed of, preferably for beef.

In order to retain ownership or use of prepotent bulls, breeders often lease or lend them for definite periods to other breeders. This may be done also with young, unproved sires. The kind of contract or lease and the cash consideration will depend on conditions. It is advisable to include in the contract or agreement a clause specifying proper care and feed, number of services, and health precautions. In special cases, it may be advisable to specify that all the bull's daughters be tested for milk and butterfat production after they freshen.

In buying a herd bull one may have a choice of a young animal of breeding age or an older proved or unproved bull. A proved sire

must have daughters with production records that can be compared with similar records of their dams. The records of the daughters may be better than those of their dams, or they may not be so good. In general, bulls that have proved to be superior in this respect are comparatively scarce, and when they are available usually command a high price. Then, too, many of these sires are rather old, and may be uncertain breeders, or they may be dangerous to handle. For these reasons many breeders follow the practice of buying young, unproved bulls from high-producing ancestry. This certainly is the best practice to follow if satisfactory proved sires cannot be obtained.

With the increase in the number of artificial-breeding associations there has been a corresponding increase in the demand for good proved bulls. This has resulted in a wide difference between the price of a proved bull and one that is not proved. Great care must be exercised in the methods used to prove bulls to be sure that the proof is an accurate measure of the bull's transmitting ability.

The proof is most reliable when it compares the records of unselected daughters of the bull with the records of the daughters' dams, all records being calculated to a mature-equivalent basis and all records being made under comparable

feeding and management conditions. It is very important to know if any records are abnormal, that is, affected by mastitis, abortion, or environmental upsets that would affect them adversely.

Sometimes the proof is based on a comparison of the average of all records of a bull's daughters with the average of all records of the daughters' dams. It is important to be sure that *all* records are included in this type of comparison. Probably the proof that most nearly tells the true transmitting ability of the bull is a comparison of the highest record of the daughters with the highest record of the daughters' dams.

Five dam-and-daughter pairs are considered as the minimum number for proving a bull, and the proof will not be too reliable unless all of the above factors are considered. Generally speaking, the greater the number of comparisons that are used, the greater the confidence that can be placed in the proof.

A dairyman interested in using proved bulls, or sons of proved bulls, should consult his county agent or State extension dairyman, who can assist him in locating them. Sons of proved bulls that have demonstrated their ability to transmit high production can usually be used with more assurance than sons of unproved bulls.

Although many satisfactory sales and purchases of bulls are made by mail, and reputable breeders have built up a considerable business on this plan, it is good practice to inspect bulls before buying. This often saves disappointment and gives one a knowledge of the conditions under which the animals were raised. In addition, one can usually see the type of the sire and dam, which are important points in selecting bulls. Photographs are valuable, but often misleading.

If bulls are shipped a great distance, they usually do not appear to

best advantage when received. For this reason, judgment should be withheld until they have had opportunity to recover from the trip. It is a good plan to keep them isolated or away from the herd. Generally speaking, it is not good practice to let animals, even from presumably healthy herds, mingle with the new herd until they have passed a period of adjustment in isolation on the new premises. Many are purchased subject to a 60-day retest for tuberculosis and Bang's disease, which is a wise precaution. In this case, the matter of isolation is usually specified in the agreement between buyer and seller.

Some breeders find it difficult to sell their young bulls at a profit, while others find it the best-paying part of their business. As a general thing, registered bulls backed up with high-production records can be disposed of with reasonable profit, if well advertised. This necessitates having the dams tested for milk and butterfat production, and if possible the sires should be proved. Experience has shown that increased prices received for bulls from tested dams often more than pay for the testing.

Cooperative Bull Associations

Many farmers who have only a small number of cows do not find it profitable to keep a bull. If such a farmer buys a sire, he may be a cheap and inferior animal. These farmers should have the use of good sires without too great expense.

Bull associations are designed primarily to enable farmers with only a small number of cows to obtain the services of good bulls at a cost within their reach, but many larger breeders also are taking advantage of them. Under this plan, several farmers in a community combine to buy registered bulls and use them cooperatively. It is desirable for the association to own three or more registered bulls. The asso-

ciation is divided into breeding blocks, and a bull is kept on a farm centrally situated in each block, where the members take their cows to be bred. Every 2 years, the bulls are shifted from one block to another. This enables the members to obtain the service of high-class bulls for a period of years, limited only by the number of bulls in the association.

Only a few cooperative bull associations are still in operation, as they have been largely superseded by artificial-breeding associations. However, the cooperative bull association serves a definite need in areas where dairy herds are so small and scattered that artificial-breeding associations have not been able to operate successfully.

Shipping Bulls

For shipping a bull by express, see that the crate is strong and of proper dimensions. The bull may be injured or reach his destination in bad condition otherwise, if shipped in a poorly constructed crate. Figure 7 shows a well constructed crate.

Supply enough feed for the animal during shipment, a waterbucket, and instructions for feeding and watering written on cardboard and tacked on the crate.

It may be advisable to have the bull insured against all hazards, for a period of from 30 to 60 days, the insurance covering the period of shipment and the time it takes him to get accustomed to new conditions.

It is best to ship old bulls long distances by freight in a boxcar with ventilators. The side doors and ventilators should be adjusted and fastened to suit weather conditions. See that there is a fence built across one end of the car so that the side doors are outside the pen, and have the bull turned loose in this pen. He should not be tied during the journey, but a short

length of chain or rope left in his nose ring will facilitate catching him. Have the pen well bedded, and put a layer of earth on the floor of the car to make the trip easier. Provide one or two barrels with canvas covers filled with water, and a waterbucket or tub. See that there is a small opening in the fence near the floor large enough for the bucket or tub, so that the train attendants can water the bull without entering the pen. Place enough hay in the pen to last the bull en route. Only in exceptional cases is it necessary to have an attendant accompany the bull, as the trainmen will attend to watering.

In moving bulls short distances a motortruck is best. For transporting old bulls, see that the truck body is strongly built and that the sides and ends are high enough to keep the bull from breaking out.

If bulls or other animals are transported across State boundary lines, obtain the necessary health certificates from the State veterinarian in charge.

Handling the Bull

Ringing

The ring is a safeguard in handling, and every bull should have one in his nose, even if he is regarded as gentle and easy to handle.

When the bull is between 8 months and a year old, a ring should be put in his nose. A copper ring 2 to 2¼ inches in diameter is satisfactory at this time, but it should be replaced by a larger and stronger gun-metal ring when he reaches 2 years of age. Rings are likely to wear and develop sharp edges, which may cut through the septum. Such rings should be replaced. It is well to place two rings in the nose of an especially unruly bull.

The ringing operation is not difficult and can be done with but little trouble if it is gone about in the right way. Tie the bull's head fast

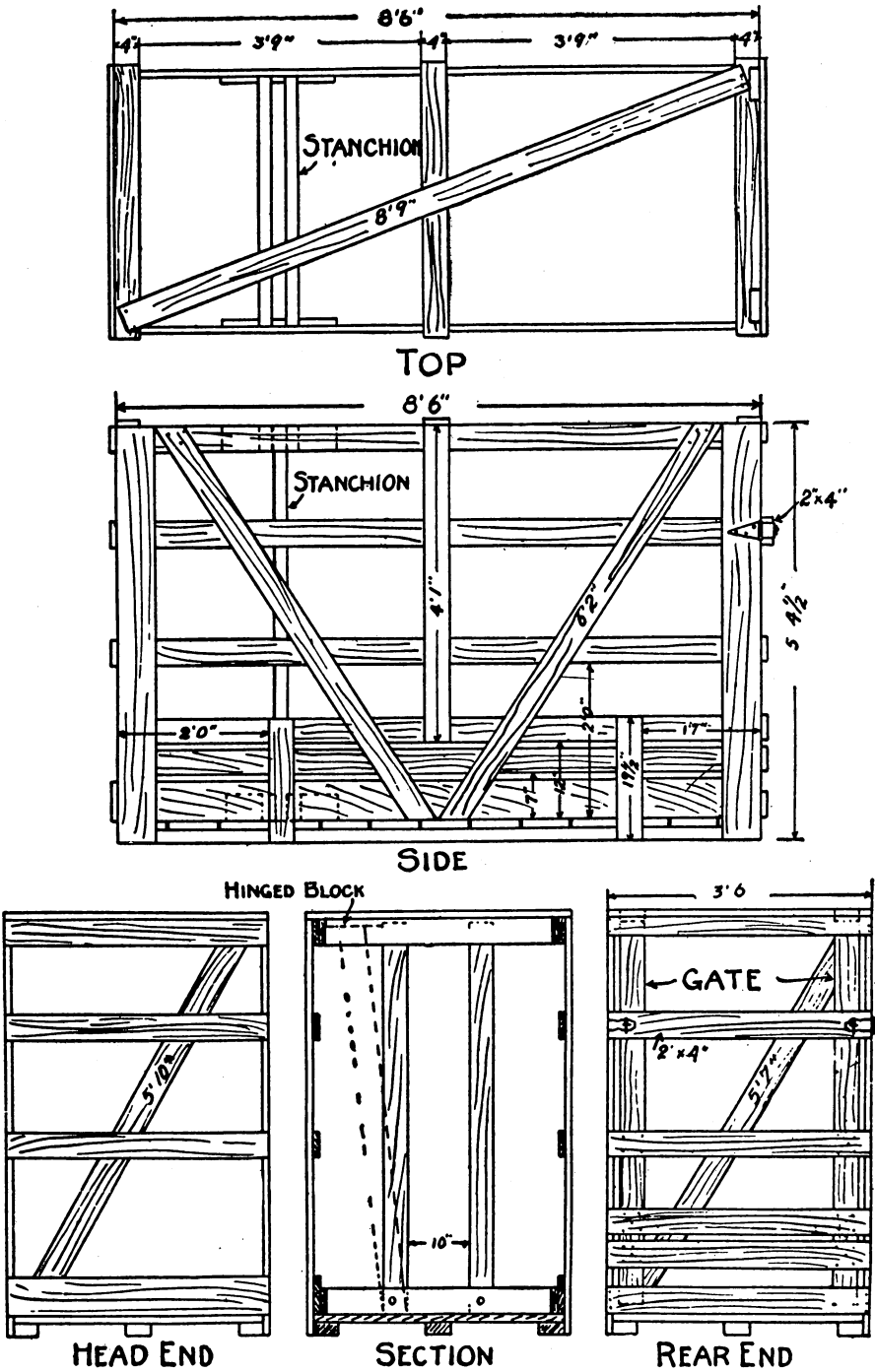


FIGURE 7.—Plan of shipping crate. The size can be changed to suit the size of the animal.

so he cannot jerk. Grasp his nose firmly, with the fingers (*A*) or a nose lead (fig. 8). Push a trocar, with cannula (*B*), through the cartilage that separates the nostrils. Then pull out the trocar, but leave the cannula (*C*). Put one end of the opened ring in the cannula (*D*), then withdraw the cannula, leaving the ring in the nose (*E*). Close the ring and replace the screw in it (*F*). File or sandpaper the joint until it is smooth. Do not tie the bull or lead him by the ring until the nose

is healed and soreness gone, which will be from a week to 10 days.

Instead of a trocar and cannula, some breeders use a sharp pocket-knife with good results. Some rings are provided with a sharp point which when opened can be used to pierce the cartilage in the nose. There are also special nose punches on the market.

Occasionally a bull pulls the ring out, tearing out the septum of his nose. This is usually caused by sudden jerking on a tight rope, be-

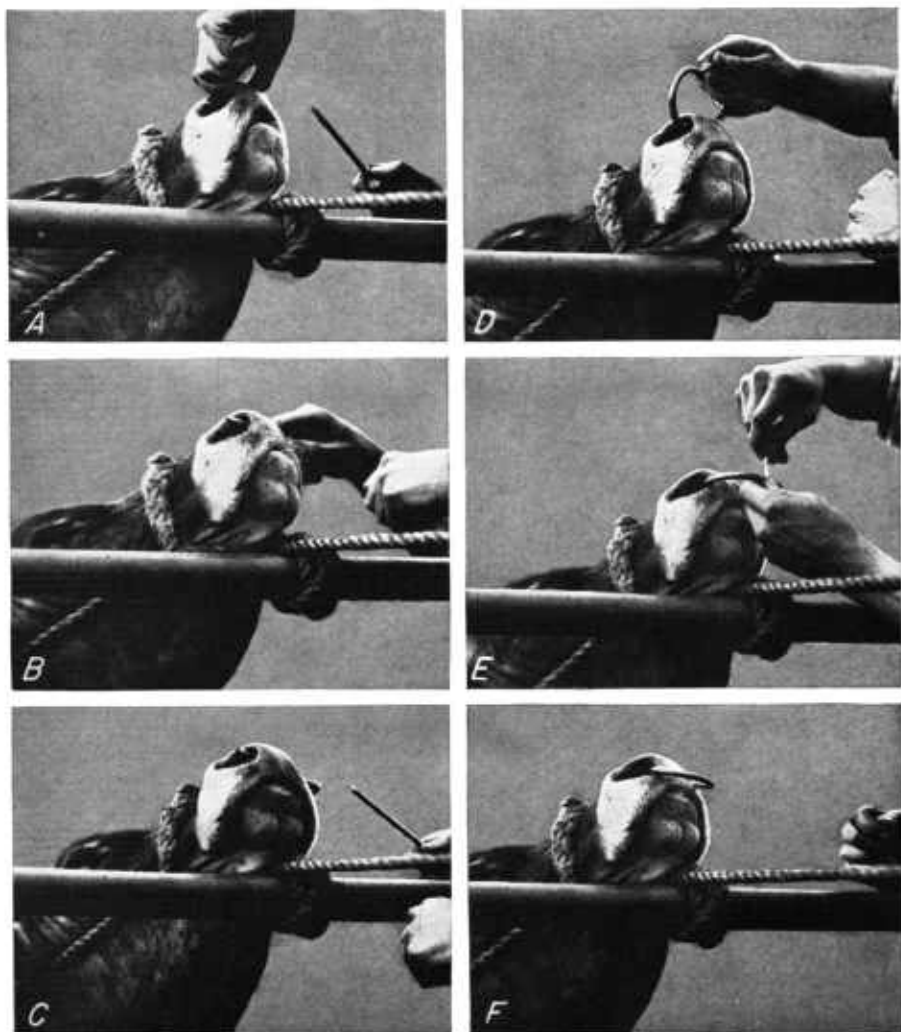


FIGURE 8.—Ringing the bull.

ing tied too short, or getting the ring caught on something. An accident of this kind is rather serious, as there is no entirely satisfactory way to remedy the condition. In some cases, the ring is placed higher up, or the cartilage is pierced the opposite way and the ring placed in a vertical position. If this is done, it is not advisable to tie the bull by the ring, as it may be torn out again. Smaller rings may be placed on either side of the torn place, with a larger ring through them. This may work all right in some cases, but is not always successful, as the three rings may give the animal considerable trouble in eating and may get caught on objects.

If the nose is torn out, the bull should be confined in a stall and the pen so arranged that it will not be necessary to handle him a great deal. If handling is necessary, it should be done only with a strong chain or leather halter which tightens across the nose when the lead rope is pulled. There are special halters on the market designed for cases of this kind.

Sometimes a veterinarian can make a surgical repair of the torn nose, joining the torn ends again so that a ring can be worn.

Hobbling

If the animal is especially vicious, it is often advisable to hobble him when handling, so that if he starts to run or attack he can be thrown to his knees. Some breeders consider this a good method of "gentling." To hobble the bull, put a rope or band around his body just behind the front legs. Have a loop or ring on this rope or band on either side of his body. Take another longer rope. Run one end through the loop, and tie the end to the pastern of a front leg. One person should lead the animal by a halter or staff while another holds the rope that is tied to his foot.

When the animal starts, a strong, quick pull on the hobble rope usually will bring him to his knees.

Throwing or Casting

It may be necessary at times to throw and tie a bull. This can be done with an inch rope—preferably cotton, which is softer and more pliable than hemp. The rope should be 40 to 50 feet long, depending on the size of the animal. One end is looped around the neck and tied with a rigid knot that will not slip (fig. 9). A half hitch is then taken around the chest and one also around the flank. The hitch must be well down on the side of the body. By pulling steadily on the free end of the rope, the animal can be thrown. It may be necessary, if the animal is large, to attach a second rope to one hind foot in order that a foot may be pulled under him, so that he can be rolled over on his side (fig. 10). Have plenty of help at hand. Figure 11 shows the animal thrown and his feet being tied.

Stocks

Stocks are especially useful for holding bulls for dehorning, trimming the feet, and some other operations. They are strongly built crates into which the animals are led and securely tied. They should be of strong material, well bolted, 9 feet long and 6 feet high, with an inside width of 2 feet 4 inches. A heavy iron ring, to which the bull may be tied, is bolted to the floor about 2½ feet in front of the stanchion. A large or a small animal can be accommodated by shifting a heavy timber in slots made at the rear for that purpose.

Hospital stalls are sometimes constructed on the same principle, with a belt or a sling attached to a pulley above. Pass the slings under the animal, and raise his weight from the floor by means of

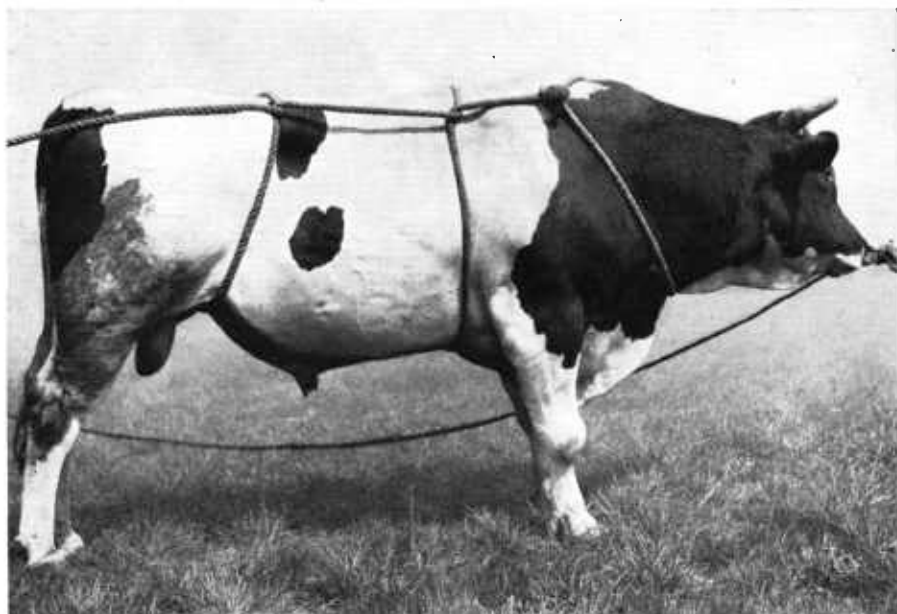


FIGURE 9.—Throwing: Method of putting rope on. Half-hitches should be well down on side.



FIGURE 10.—Throwing: The left hind leg is being pulled under the body with a second rope, so that the bull can be rolled on his left side.



FIGURE 11.—Throwing: Method of holding and tying the feet.

the pulley and derrick. Then, with his feet tied to the floor or uprights, he can be worked on with little danger that he will get loose. It often is difficult, however, to lead large or heavy animals into stocks and hold them there, in which case it may be necessary to throw them.

Staff for Leading

The bull should be trained to lead while still a calf, first with a halter, and later with a staff attached to the ring in his nose (fig. 12). There are a number of good bull staffs on the market. They are equipped with locking devices, so that if

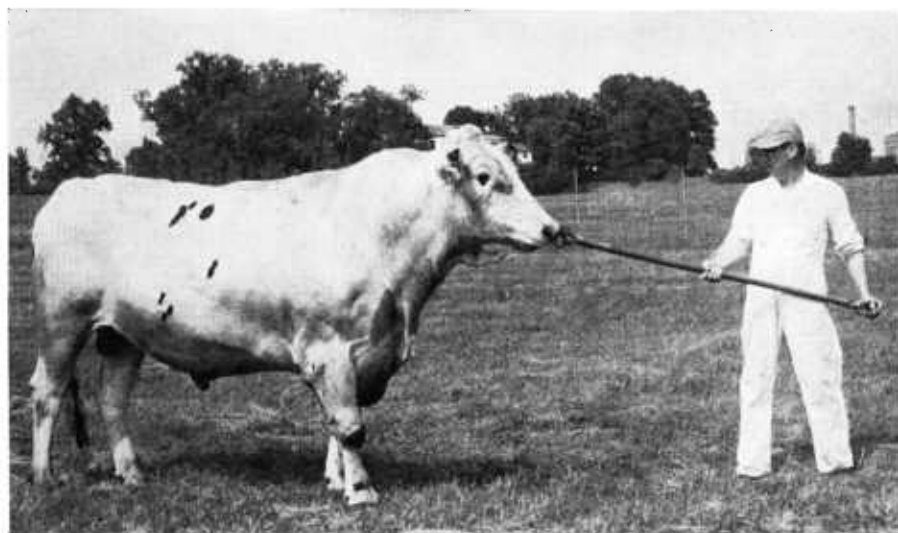


FIGURE 12.—Proper way to hold bull with a staff.

properly handled there is little danger of their becoming unsnapped. A hand grip on the end aids materially.

Caution in Handling

Always handle a bull in a firm manner and never trust him. Many accidents have resulted from trusting the so-called gentle bull. It often happens that a man is injured or killed as the result of taking chances.

Bulls have an unpredictable viciousness of disposition probably unequalled by any of our domestic animals. They easily qualify as the most dangerous beast on the farm. Their enormous strength and killing instinct when aroused should never be discounted, even in the face of a docile life history.

Never take a bull on a public highway unless he can be kept under absolute control. Many serious accidents have occurred as a result of allowing so-called gentle bulls to graze along country roads or when driving them to and from pasture with the cows on public highways. Some States have laws prohibiting these practices.

Feet and Horns

Trimming the Feet

Bulls kept in close quarters with little exercise frequently develop long hoofs. This condition is not only unsightly, but may become so painful that the bull cannot stand or walk squarely. Then, too, it brings on various other foot troubles, such as foul foot and rot. The hoofs should be trimmed, or they will break off or disfigure the animal's feet. Hoofs of young animals often can be trimmed with a long-handled chisel, while the animal is standing on a hard dirt or plank floor. The sole and the cleft between the claws cannot be got at in this way, however, and often



FIGURE 13.—Trimming feet: Clipping off the toe of the hoof with pincers.

these parts cause the most trouble. In that event it may be necessary to throw and tie the animal.

A pair of pincers—the kind used in shoeing horses—is a handy implement for clipping off the toe of the hoof, or it can be sawed off with a fine-tooth saw (fig. 13). A shoeing knife can be used to trim out the sole and dead hoof, and then a rasp can be used to smooth down the surface (figs. 14 and 15). The dewclaws, which often grow to great length, should also be trimmed off fairly close (figs. 16 and 17).



FIGURE 14.—Trimming feet: Cutting out the sole. Note the long toes.



FIGURE 15.—Trimming feet: Rasping.

Dehorning

Preferably bulls should be dehorned as calves, though some breeders do not follow this practice because of the possibility of injuring the sales value for buyers who might want to show the animal. A number of different methods are used for dehorning animals, such as the caustic stick, electric cauter, gouge, rubber bands, dehorning clippers, and saws. For practical purposes and efficiency of results, the caustic stick usually is used for calves and dehorning clippers or actual sawing of the horns for older animals. A vicious bull often is dehorned to make him easier to handle.



FIGURE 16.—Trimming feet: Note the long dewclaws.



FIGURE 17.—Trimming feet: Dewclaws properly trimmed.

It is best to have a veterinarian or other experienced man dehorn older animals. For additional information, see Farmers' Bulletin 1600, Dehorning, Castrating, Branding, and Marking Beef Cattle.

Training Horns

If bulls have not been dehorned as calves it is often desirable to train the horns in order to get the shape typical of the breed. The best time to begin is when the bulls are quite young. There are several devices that can be bought or made to suit different kinds of horn development.

Trimming and Polishing Horns

If it seems desirable to trim and polish the horns, this can be done with a rasp, pieces of glass, and fine sandpaper. Use the rasp first to smooth off the dead tissue and uneven places. Then scrape the rough spots with the edges of freshly broken glass. Always scrape the horn with the grain, not across. With fine sandpaper, make the horn smooth and ready for polishing. Apply linseed oil and pumice stone, or metal polish, and polish with flannel cloth or chamois skin.